AMENDMENTS TO THE DRAWINGS

Applicant submits herewith one Replacement Sheet for FIG. 2 in which the feature of "an opto-electrical conversion unit" has been added. Applicant respectfully requests that the Examiner approve the submitted Replacement Sheet.

Attachment: 1 Replacement Sheet (FIG. 2)

REMARKS

Status of Application

Claims 1, 3, 4, 6, and 7 are all the claims pending in the application. Claims 1, 3, 4, 6, and 7 have been rejected.

Objections to the Drawings

The Examiner has objected to the drawings under 37 CFR 1.83(a) alleging that the recited "an opto-electrical conversion unit" must be shown or the feature canceled from the claims. Applicant has submitted herewith a Replacement Sheet for FIG. 2 in which the feature of "an opto-electrical conversion unit" has been added. No new matter has been added.

Accordingly, Applicant respectfully requests that the Examiner withdraw these objections.

Claim Rejections 35 U.S.C. § 103

Claims 1 and 3-4, 6-7 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over US Patent no. 7,386,042 to Brewer et al. (hereinafter "Brewer") in view of US Publication no. 2003/0020987 to Kanesaka (hereinafter "Kanesaka"). Applicant respectfully traverses all of these rejections.

Without conceding to the merits of the Examiner's rejections, claim 1 has been amended, as set forth above.

Applicant respectfully submits that Brewer, Kanesaka, and any combination thereof, fails to teach or suggest all the features of claim 1 and, therefore, claim 1 is patentable over the cited references for at least these reasons.

As explained in the present Specification, for instance, illustrative embodiments of claim 1 are directed to recovering a clock signal from a distorted optical signal with an improved tolerance for dispersion (*see e.g.,* Specification, page 2, lines 9-17). In particular, claim 1 recites the combination of a frequency filter which transmits only around B/n (wherein B is the bit rate of the electrical data signal) and a frequency multiplicator unit, which performs a frequency multiplication of the filtered signal by a factor of n, to obtain a frequency signal with $f = B$. As a result, illustrative embodiments of the invention recited in claim 1 effectively replace a part of the frequency spectrum that is too weak for clock recovery with a spectral component having significantly higher signal power and, thus, achieve a dramatically improved dispersion tolerance.

However, the teachings of Brewer and Kanesaka are completely different than claim 1 and neither Brewer nor Kanesaka teach or suggest the claimed features, much less mention the idea of effectively replacing a part of the frequency spectrum that is too weak for clock recovery with a spectral component having significantly higher signal power to improved dispersion tolerance.

Unlike claim 1, Brewer is not directed to how to recover a clock signal from a distorted optical signal. Quite to the contrary, Brewer is directed to an apparatus for measuring jitter in a digital input signal. Rather than teaching the features of claim 1, Brewer teaches that the offset circuit 102 determines the frequency of the pulse-train received from the converter 101 using known clock recovery techniques (Brewer, column 3, lines 39-42). Brewer teaches that, after the clock signal is extracted from the original digital input signal, it is then offset by a predetermined frequency and smoothed to eliminate jitter therefrom (Brewer, column 1, lines 45-52).

In further contrast to claim 1, Kanesaka also is not directed to how to recover a clock signal from a distorted optical signal with an improved tolerance for dispersion. To the contrary, Kanesaka teaches an opto-electrical conversion unit 12 that converts a received optical signal into an electric signal and which is purportedly independent of the optical transmission bit rate (Kanesaka, paragraph 0019).

However, Brewer, Kanesaka, and any combination thereof, fail to teach or suggest all the features of claim 1. For instance, claim 1 recites (in part):

> …a frequency multiplicator unit, which frequency-multiplies the filtered converted electrical data signal, thereby producing a frequency-multiplied signal…

The grounds of rejection allege that Brewer's teachings regarding the converter 101 generating a pulse-train corresponds to the claimed frequency multiplicator unit. Applicant respectfully disagrees. Brewer teaches nothing more than that the converter 101 converts the digital pulse-train received at input 100 into a continuous pulse-train and does not frequency-multiply a filtered converted electrical data signal, as claimed.

Further, although Brewer does mention frequency multiplication, Brewer teaches that <u>the offset clock signal</u> is frequency multiplied and does not teach frequency-multiplying a filtered converted electrical data signal, as recited in claim 1. Thus, Applicant respectfully submits that claim 1 is patentable over the cited references for at least these reasons.

Second, claim 1 recites:

> …wherein the frequency-multiplied signal is used to drive the phase locked loop circuit…

The ground of rejection again rely on Brewer as allegedly teaching the above features. Applicant respectfully disagrees. As taught in Brewer, the phase locked loop 103 is driven by the offset clock signal generated by the clock frequency offset circuit 102 and is not driven by a frequency-multiplied signal, as claimed (*see e.g.,* Brewer, column 3, lines 39-61; FIG. 1). Indeed, Brewer teaches that the phase locked loop 103 generates a jitter-free pulse-train that can be used for a reference clock (Brewer, column 3, lines 53-55). Brewer teaches that the pulse-train thus generated can be multiplied by an integral factor and such a multiplied signal is output from the phase locked loop 103 (Brewer, column 3, lines 55-61). However, Brewer fails to provide any teaching or suggestion regarding using a frequency-multiplied signal to drive the phase locked loop 103, as recited in claim 1. Therefore, Applicant respectfully submits that claim 1 is patentable over the cited references for at least these additional independent reasons.

Finally, claim 1 recites:

> …a frequency filter for the spectral power of the converted electrical data signal…
>
> …wherein the frequency filter transmits only around *B*/*n*, wherein *B* is the bit rate of the electrical data signal…

The grounds of rejection acknowledge that Brewer fails to teach or suggest a frequency filter for the spectral power of the converted electrical data signal, as claimed. Nonetheless, the Examiner alleges that Kanesaka remedies the deficient teachings of Brewer. Again, Applicant respectfully disagrees.

Kanesaka merely teaches that the optical receiving unit therein can include a filter having a cut-off frequency that is controllable in accordance with the frequency of an input clock signal that is generated independent of an optical signal received by the optical transmitting apparatus

(*see e.g.,* Kanesaka, paragraphs 0042-0046). That is, Kanesaka teaches that the optical transmitting and receiving apparatus 10 recognizes the optical transmission bit rate based on the input clock signal CLK IN for use in transmitting data from the electro-optical conversion unit 11 and controls frequency characteristics of opto-electrical conversion unit 12 in accordance with the optical transmission bit rate (*see e.g.,* Kanesaka, paragraph 0055). In particular, Kanesaka teaches that it is recommended that the cut off frequency of the low-pass filter 23 is constantly about 70% of the optical transmission bit rate (Kanesaka, paragraph 0076).

In sharp contrast to claim 1, Kanesaka fails to teach or suggest the features of a frequency filter for the spectral power of the converted electrical data signal. Indeed, Kanesaka teaches nothing more than a low-pass filter and makes no mention regarding spectral filtering at all, much less teach the features of a frequency filter for the spectral power of the converted electrical data signal that transmits only around B/n, wherein B is the bit rate of the electrical data signal. Further, Kanesaka fails to provide any suggestion whatsoever to relate the characteristics of a frequency filter for the spectral power of the converted electrical data signal to the factor by which a frequency multiplicator unit performs frequency multiplication on the filtered signal, as claimed. Therefore, Applicant respectfully submits that claim 1 is patentable over the cited references for at least these additional independent reasons.

In view of the above, Applicant respectfully submits that claim 1 is patentable over the cited references. Moreover, the dependent claims 3-4 and 6-7 are allowable *at least* by virtue of their dependency. Thus, Applicant respectfully requests that the Examiner withdraw these rejections.

Finally, <u>Applicant again draws the Supervisory Examiner's Attention to MPEP § 707.02 and requests that the Supervisory Patent Examiner personally check on the pendency of this application with a view to finally concluding its prosecution</u>.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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23373
CUSTOMER NUMBER

Date: June 23, 2010